FOR EMERGENCY DRINKING SUPPLIES

Bell

WATER STERILISER

As supplied to the Air Ministry, Ministry of Aircraft Production and to Urban, Rural and County Health and ARP Authorities

Plant to give continuous flow-rate of
250 gals per hour
comprising. 6, 50 gallon treatment tanks
2 130 " per hour Filters
Interconnecting pipework Etc.
Chemicals to treat 6000 gallons
Testing Equipment Etc Price £128-0-0

BELL BROTHERS (DOMESTIC) LTD

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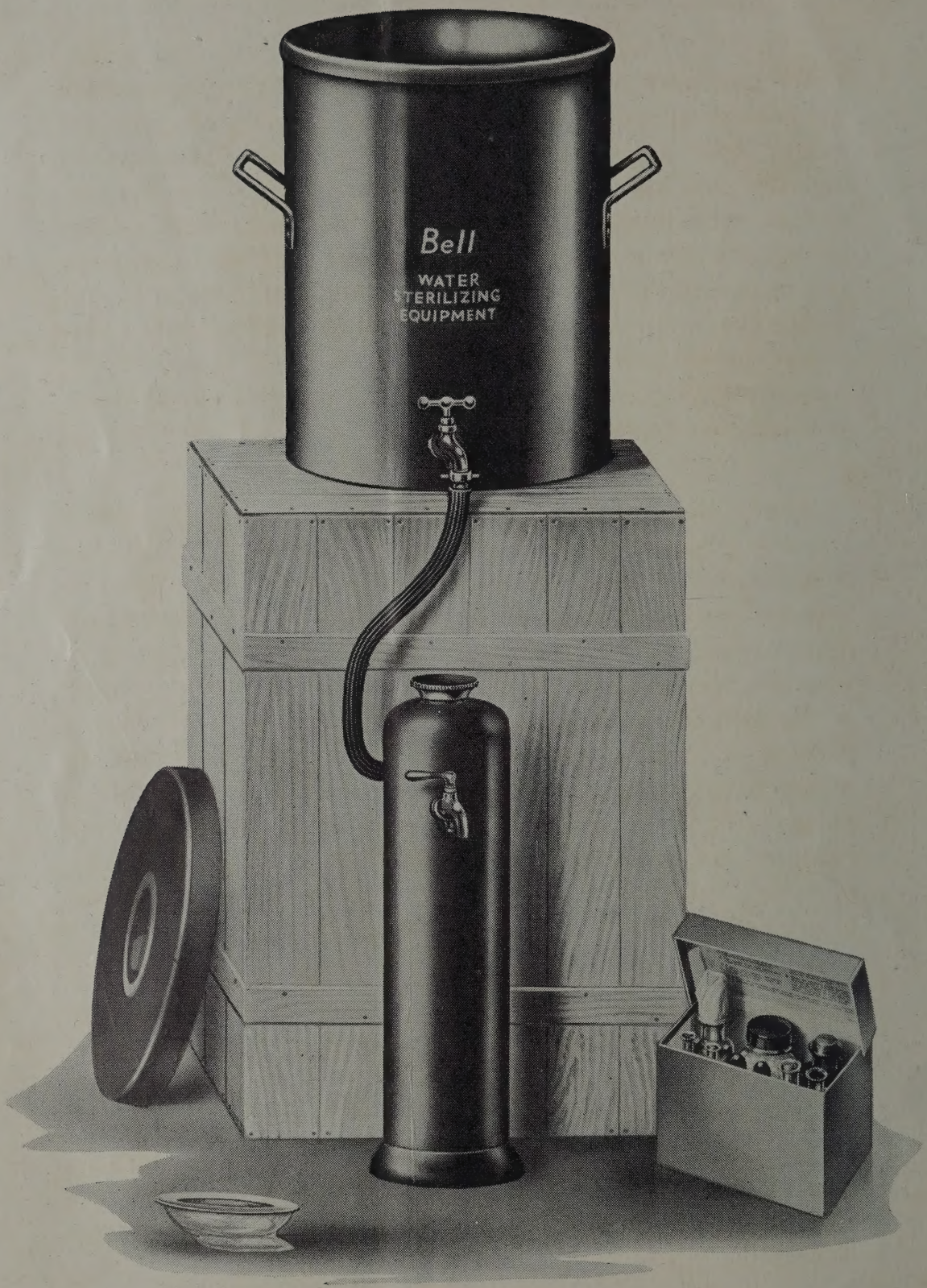
Telephone EAST STOKE 208

WORKS: WESTFORD MILLS, WELLINGTON, SOMERSET

Installation Supervised.

Further Chemicals to treat 3000 gallons
£1-14-0 per set



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BELL WATER STERILISER

THIS compact and portable water purifying apparatus has been designed to enable emergency supplies of water, no matter how polluted, to be rendered clean and bacteriologically safe, and suitable for drinking supply, First Aid use, and all such purposes. Local authorities and water undertakings provide means for chlorination of main water supplies, as a safeguard against accidental or wilful contamination ; but where the water main is broken, or the public supply interrupted by air bombardment or other form of enemy action, the only available supply might for some time be such water as could be obtained from ponds or streams, or even sewage polluted water from gutters or broken pipes.

Public water authorities are equipped to repair broken mains and restore services at short notice, but the possibility of numerous simultaneous breakages might inevitably lead to absence of a pure supply during the critical hours when it was most needed for emergency drinking supply, the washing of wounds, preparation of dressings and the like. The purpose of the Bell Steriliser is to provide a safe sterile water during periods of interruption of public supplies. Many establishments have storage tanks of water not to be regarded as normally fit for consumption, whilst in other cases temporary recourse can be had to ponds, streams or any available source of water, and this, no matter how impure, can be rapidly filtered and sterilised by this simple portable apparatus.

It is, of course, equally suitable for the regular provision of drinking water in isolated districts, where well or surface water is available, but is not to be regarded as bacteriologically safe. The Air Ministry have standardised the apparatus for use at isolated stations.

The apparatus consists of a ten-gallon storage tank, suitably lined with chlorine resisting material, and a combined dechlorinating and filtering unit. The storage tank is filled with

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BELL WATER STERILISER

any available water, no matter how dirty or contaminated. Foul gutter washings from a broken water main, or green water from a stagnant pond, are equally suitable for treatment. A cloth strainer fitted into the lid of the tank removes the coarse debris. A dose of sterilising agent (supplied with the equipment) is mixed with the water, which is then allowed to stand for about 20 minutes. It is now drawn off for use as required, at any speed up to $\frac{1}{2}$ gallon a minute, through the filter, which takes out suspended matter, colour, taste and odour, and at the same time removes any excess of sterilant. The water discharged is free from unpleasant taste or odour, and bacteriologically pure and safe for consumption.

Whilst the primary object of the apparatus is to effect sterilisation by super-chlorination and subsequent dechlorination, the dechlorinating unit also serves as a filter, and removes suspended matter, colour, odour, and taste to a marked extent, giving a filtrate which is entirely suitable for drinking purposes.

The cost of treatment is less than a **halfpenny a gallon,** and the water is available at fifteen minutes' notice. The advantage is obvious over the alternative treatment of boiling, which is costly and under emergency conditions may be quite impracticable on a useful scale. The Bell Steriliser can be repeatedly used, giving an output of 15–20 gallons per hour all day long if necessary. The filter bed is sufficient to dechlorinate many thousands of gallons, and is readily and cheaply renewed when this becomes necessary.

An important feature of the Steriliser is that the efficiency of the sterilising process can be positively verified during operation. The necessary testing apparatus is provided, enabling the presence of free chlorine to be determined in the chlorinated water, thus ensuring that complete sterilisation has taken place. A further test at the filter outlet gives evidence that all excess chlorine has been removed, giving

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BELL WATER STERILISER

a sure indication that the water is bacteriologically safe, but free from chlorinous taste or odour.

The unit is portable, readily set up for immediate use, and suitable for unskilled operation. The instructions and equipment enable any person, completely unfamiliar with the apparatus or the process, to produce a satisfactory drinking supply without delay.

Apart from the value of the Bell Steriliser for the regular treatment of drinking water for isolated establishments not connected with public supply systems, it is indispensable as a water sterilising unit for every First Aid station, warden post and air raid shelter; whilst its importance for the provision of emergency pure water supplies when public mains are temporarily out of commission cannot be overrated.

Whilst the standard apparatus consists of a ten-gallon sterilising tank and a dechlorinating unit having an output capacity of $\frac{1}{2}$ gallon per minute, other sizes can be supplied for special requirements. Thus in many cases it is convenient to have a sterilising tank of 50 gallons capacity, which with the standard dechlorinating unit gives an output of $\frac{1}{2}$ gallon per minute for 100 minutes. Two such tanks or a single tank of 100 gallons capacity coupled to a dechlorinating unit of larger size gives a filtered and sterilised water draw-off at the rate of 2 gallons per minute for 50 minutes at a time. Allowing 30 minutes for re-filling the tank and for the sterilising reaction, such an equipment would be capable of giving an output of upwards of 800 gallons per day of 12 hours. Units of larger capacity can be supplied as required.

In all its forms, the equipment is made of heavy gauge metal, suitably protected against the action of the reagent, and is therefore not liable to be broken or rendered unserviceable by the effects of aerial attack at the very time when its need is most vital.

for emergency drinking supplies

EXTRACTS
FROM PUBLIC ANALYST'S REPORT

The apparatus is intended for the emergency treatment on a small scale of polluted water, the objects being to render the water safe, from the bacteriological standpoint, and also of reasonable clarity and palatability.

Tests were carried out, both with water artificially infected with laboratory cultures and B. coli and with water with turbidity and marked organic impurity, polluted with sewage.

EXPERIMENT 1

Water used : Laboratory tap water, artificially infected with laboratory culture of B. coli.

	Raw Water.	**Filtered Water.**
Approximate number of B. coli per 100 mls.	23,000	Nil

EXPERIMENT 2

The above test was repeated, the tap water receiving an excessively heavy inoculation with the laboratory culture of B. coli, the resultant water being much more heavily infected than was likely to be the case in practice.

	Raw Water.	**Filtered Water.**
Approximate number of B. coli per 100 mls.	Millions	Nil

EXPERIMENT 3

Water used : Tap water to which sewage had been added in the proportion of half a gallon to 9½ gallons of tap water or 5 per cent.

	Raw Water.	**Filtered Water.**
Approximate number of B. coli per 100 mls.	1,300,000	Nil

This test shows that under very severe conditions, the water in this case being equivalent to a sewage effluent, reasonably satisfactory results could be obtained.

EXPERIMENT 4

Water used : River Thames water, collected in the City, where it is known to be appreciably polluted.

	Raw Water.	**Filtered Water.**
Approximate number of B. coli per 100 mls.	450,000	Nil

It is concluded from these tests that if the directions are carefully carried out, satisfactory sterilisation can be obtained even with grossly polluted waters of defective clarity.

We are of the opinion that the chlorine dose arranged for is adequate under any reasonable conditions.

In conclusion, we would express our view that the apparatus fulfils a useful purpose, and we consider that chlorination and carbon filtration is as good a method as any for the emergency treatment of small supplies of water, in the absence of boiling.

DIRECTIONS FOR USE

A—Assemble apparatus as shown in diagram. Bottom of tank must be supported at least two feet above top of filter. Support must be firm, as tank when full weighs about a hundredweight. *Close taps on tank and filter.*

B—Take TWO charges of the sterilising liquid by means of the pipette, filling the pipette to the white line, and mix thoroughly with one pint of water.

C—Pour mixture into tank, and fill up with water to be purified. Use the clearest water available. Tank contains 10 gallons and should be filled through linen bag placed in lid. Stir well but do not damage enamel inside tank.

D—WATER MUST STAND AT LEAST 20 MINUTES.

E—Take sample from tank, adding four drops of solution marked '1'.

F—If yellow colour appears, sterilisation is effective. If no colour, repeat 'A' and 'B' until it does.

G—Open tap on filter.

H—Open tap on tank. If taps are not opened in this order, airlock may occur.

I—Take further sample at outlet of filter, repeating test 'E' with clean tube. A colourless reaction indicates freedom from excess chlorine. If yellow colour is obtained, water is still safe to drink, but may have 'chlorine' taste. Free filter of chlorine as instruction K.

J—Close tap on filter when water begins to issue. Water can now be used, being drawn off as required from tap on filter.

K—When the sterilising bottle has been emptied, or when yellow colour is shown by rest of filtered water, dissolve contents of bottle '2' in last eighth of water in tank and allow to flow through filter *to waste.* The plant is ready to deal with a further 500 gallons of water.

L—If yellow colour still persists on test of filtered water, the filter requires re-charging with the dechlorinating material.

Printed by Spottiswoode, Ballantyne & Co. Ltd., London

PURE DRINKING WATER

Available from any polluted source

BY USE OF THE BELL STERILISER